ROLE OF DIAGNOSTIC HYSTEROLAPAROSCOPY IN EVALUATION OF PRIMARY AND SECONDARY INFERTILITY

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ABSTRACT: BACKGROUND AND OBJECTIVES: Laparoscopy is considered the gold standard for diagnosing tubal and peritoneal disease. The present study was aimed to evaluate the role of hystero-laparoscopy in the study of primary and secondary infertility so as to identify the various pathological conditions in female reproductive tract leading to primary/ secondary infertility and also to observe the complications of the procedure. **METHODOLOGY:** The present one year observational study was done in the Department of Obstetrics and Gynecology of a tertiary care hospital situated in Davanagere, Karnataka from January 2012 to December 2012. A total of 100 infertile women, anxious to conceive, coming for infertility work-up in hospitals underwent hystero-laparoscopy. **RESULTS:** The commonest age group was 26 to 30 years (57%) and the mean age was 27.27 ± 3.59 years. The history of consanguineous marriage was present in 20%. Majority (74%) of the women reported regular cycles while 26% of the women reported irregular menstrual history. Almost half of the study population (50%) had duration of infertility between 4 to 6 years and the mean duration was 4.62 ± 1.58 years. Primary infertility was noted in 79% of the women and PCOS was the commonest finding noted in 18.99%. In women with secondary infertility, pelvic inflammatory disease was the commonest diagnosis (19.05%). Majority (96.20% and 90.48% respectively) of the women with primary and secondary infertility did not have any complications. **CONCLUSION AND INTERPRETATION:** Diagnostic hysterolaparoscopy identifies the various pathological conditions leading to primary and secondary infertility and thus helps obstetrician for effective management hence it may be performed in all infertile patients.

KEYWORDS: Hysterolaparoscopy; Hysteroscopy; Infertility; Primary infertility; Secondary infertility.

INTRODUCTION: Historically the human race has placed emphasis on infertility. Nothing more vividly demonstrates the importance of fertility to individual than the reaction by and to those who do not have children. It is estimated that, approximately 8-10% of couples are childless against the wishes of the partners which makes it as a common problem.¹

According to the International Committee for Monitoring Assisted Reproductive Technology and the World Health Organization, infertility is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse'.²

Global estimates suggest that nearly 72.4 million couples experience fertility problems.² World health organization estimates in 2010 reported that, 1.9% of women aged 20–44 years who wanted to have children were unable to have their first live birth (primary infertility) and 10.5% with a previous live birth were unable to have an additional live birth (secondary infertility). The levels of infertility were similar in 1990 and 2010, with only a slight overall decrease in primary infertility (0.1%, but with a more pronounced drop in Sub-Saharan Africa and South Asia) and a modest overall

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increase in secondary infertility (0.4%). The prevalence of primary infertility was higher among women aged 20–24 years than among older women. Primary infertility rates among women wanting children also varied by region, from 1.5% in Latin America and the Caribbean in 2010, to 2.6% in North Africa and the Middle East. With a few exceptions, global and country patterns of secondary infertility were similar to those of primary infertility.³

The prevalence of infertility ranges from 3.5% to 16.7% in more developed nations and from 6.9% to 9.3% in less developed nations, with an estimated overall median prevalence of 9%.⁴ There is escalating incidence of infertility in India. According to Delhi IVF Infertility Research Centre, infertility affects one in six couples. The recent National Family Health Survey (NFHS) estimates showed that, childlessness in 2.4% of currently married women aged over 40 years.⁵

Infertility is caused by male and/or female factors. Female factor infertility can be divided into several categories: cervical or uterine, ovarian, tubal, and other.⁶ The diagnosis and treatment of this disorder stands out as one of the most rapidly evolving area in medicine. Experience has shown that majority of pelvic pathology in infertile women is frequently not well appreciated by routine pelvic examinations and the usual diagnostic procedures.³ Infertility is generally a tragedy to the couple and brings forth family unhappiness and mental disharmony. Hence it's the responsibility of the gynecologist to make a correct diagnosis of the cause of infertility and plan the treatment protocol accordingly. A complete examination of a woman's internal pelvic structures can provide important information regarding infertility and common gynecologic disorders.⁷

Hystero-laparoscopy becomes the "Third eye of the gynecologist" in diagnosis of infertility. Frequently, problems that cannot be discovered by an external physical examination can be discovered by laparoscopy and hysteroscopy, two procedures that provide a direct look at the pelvic organs. These procedures may be recommended as part of your infertility care, depending on your particular situation. Laparoscopy and hysteroscopy can be used for both diagnostic (looking only) and operative (looking and treating) purposes.⁷ The ability to see and manipulate the uterus, fallopian tubes, and ovaries during laparoscopy has made it an essential part of infertility evaluation. Similarly, visualizing the uterine cavity and identifying the possible pathology has made hysteroscopy an equally important tool in infertility evaluation. The question of tubal morphology and patency, ovarian morphology, any unsuspected pelvic pathology, and uterine cavity abnormalities can all be resolved with accuracy at one session. Additionally, hysteroscopic guided biopsy and therapeutic procedures like polypectomy, myomectomy, septal resection, and adhesiolysis can be done in the same sitting.³

Studies have shown that diagnostic laparoscopy and diagnostic hysteroscopy are effective procedures for evaluation of long term infertility.⁸ In infertile couples laparoscopy reveals abnormal findings in 21.68% of cases after normal hysterosalpingography.⁹ Also, diagnostic hysteroscopy is a very important method for investigation of the reasons of female infertility.¹⁰ Hystero-laparoscopy is a quintessential tool for the diagnosis, treatment and prognosis as it allows the gynecologist to develop the plan of therapy in infertile patients. However, to date, few studies have assessed the role of combined diagnostic laparoscopy and simultaneous diagnostic hysteroscopy in cases of female infertility and no such study was undertaken in our settings using this approach. Hence the present study was planned to evaluate the role of hystero-laparoscopy in the study of primary and secondary infertility, to identify the various pathological conditions in female reproductive tract leading to

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primary/ secondary infertility, to develop a plan for therapy and to analyze the rate of complications in diagnostic hystero-laparoscopy.

METHODOLOGY: This cross-sectional study was conducted over a period of one year in the Department of Obstetrics and Gynecology of a tertiary care center in Davanagere, Karnataka from January 2012 to December 2012. Prior to the commencement of the study, ethical clearance was obtained from Human Ethics Committee. A total of 100 Married women aged between 18 to 40 years with primary/secondary infertility who were willing for infertility workup with normal semen analysis of the husband were included in the study. Women with severe cardiac/ respiratory illness, acute generalized peritonitis, anesthetic problems, diabetes mellitus, severe anemia, sexually transmitted diseases, severe urinary tract infection and not willing for surgery were excluded.

The patients satisfying selection criteria were informed in detail about the nature of the study and a written informed consent was obtained. After the enrollment, demographic data such as age, religion, education, socio economic status, were obtained through an interview. Detailed history including complaints, married life, obstetric, sexual, menstrual, medical and pharmacological history was documented and clinical examination was performed. These findings were recorded on a predesigned and pretested proforma.

Hysterolaparoscopy was performed in the pre ovulatory period between days 6-10 of the cycle for infertility evaluation. Routine investigations such as hemoglobin percentage, blood group and Rh type, VDRL, RBS, Urine routine and microscopy, and chest X-ray were done. Specific investigations like Semen analysis were done to rule out the male factors of infertility, pelvic ultrasound and endometrial biopsy were done in some specific cases. Hysterolaparoscopy was done under general anesthesia after the opinion of the anesthetist.

Diagnostic Laparoscopy was performed using a 7 mm Karl Storz laparoscope with a 30 degree deflection angle telescope powered with a fiberoptic cable for light source. A careful evaluation of the fallopian tubes, ovaries, pelvic peritoneum, pouch of Douglas and peritoneal cavity was done. The features suggestive of infertility were looked for. Chromopertubation was done to see the tubal patency on both the sides. On laparoscopy, pelvic cavity and organs were inspected. Uterus was inspected for its shape, size, position and surface. Cul-de-sac was examined for any adhesions, obliteration, endometriotic nodules or fluid. Ovaries were viewed for size, shape, surface, color, presence of cysts and relation with tubes.

Fallopian tubes were inspected carefully for size, shape, surface, kinking, dilatation, stricture or hydrosalpinx. Laparoscopic chromopertubation was performed for testing tubal patency in which methylene blue dye was injected with a 20ml syringe via Leech Wilkinson cannula and spillage of dye from the fimbrial end of tube visualized.

On hysteroscopy, uterine cavity was examined for the presence of septum, any congenital malformation, fibrotic bands, polyps, myomas, endometrial appearance, thickness and color. Endocervical canal was visualized for any growth or polyps. Both the tubal ostia were visualized.

Statistical analysis: The data obtained was coded and entered into Microsoft Excel Worksheet. Categorical data was expressed as rates, ratios and proportions and continuous data was expressed as mean $\pm$ standard deviation (SD).

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RESULTS: Most of the women (57%) were aged between 26 to 30 years. The mean age of the study population was 27.27 ± 3.59 years. Based on kuppuswamy index 39% of the women had education upto grade IV and class III socio economic status (64%). The menarcheal age was noted as 13 years in 52% of the women and history of consanguinous marriage was present in 20%. Majority (74%) of the women reported regular cycles while 26% of the women reported irregular menstrual history. Almost half of the study population (50%) had duration of infertility between 4 to 6 years followed by 3 years or less (45%) with mean duration of infertility being 4.62 ± 158 years. Majority (79%) of the women presented with primary infertility while secondary infertility was noted in 21% of the women.

On speculum examination, 85% of the women had normal cervix and 15% women had abnormalities. Among those with abnormalities, erosion was the commonest finding noted in 12% women. Bimanual examination of the uterus revealed anteverted uterus in 80% of the women while 20% of the women had retroverted uterus. Also bulky and atrophic uterus was noted in 9% and 1% of the women respectively while mobile uterus was seen in 90% of the women and restricted mobility was observed in 10%. With regard to fornices, full fornices were noted in 10% of the women and free fornices in 90% of the women.

The laparoscopic examination findings for size and shape of uterus included bulky, congested, hypoplastic (1.27% each) and irregular uterus (10.13%) in women who had primary infertility while in those with secondary infertility 4.76% of the women bulky uterus. (Graph. 1). With regard to size and shape of ovary, cystic (6.63%), endometrial implants (2.53%), enlarged (43.04%) and adhesions (1.27%) were noted in women with primary infertility and in those with secondary infertility, cystic (9.52%), enlarged (4.76%), atrophic (4.76%) and adhesions (4.76%) were observed (Graph. 2). Among the women with primary infertility, ovary color was shiny in 37.97% and pale in 2.53% of the women. In those with secondary infertility, shiny color was seen in 4.76% of the women (Table 1). The appearance of inflamed tubes was noted in 2.53% of women with primary infertility, compared to 19.05% women with secondary infertility. The other findings are as shown in Table 2. Left adhesion was present in one case of secondary infertility (4.76%) while in another case the fimbria was seen (1.27%). Chromopertubation was positive in 72.15% of women with primary infertility compared to 42.86% of the women with secondary infertility.

Subserous anterior wall was the fibroid location in 10.13% of the women with primary infertility and subserous fundal location was seen in 1.27% but, in women with secondary infertility, subserous anterior wall was observed in 4.76% and none of the women had latter location. Endometrial implant adhesions were positive in 10.13% of the women with primary infertility compared to 9.52% women who had secondary infertility. Peritoneal findings on laparoscopy included tubercles on ovary, tubes and peritoneum, omental adhesions and grade I endometriosis in 2.53% cases each and hydatid cyst of morgagni was present in 1.27% cases with primary infertility. In those with secondary infertility, 9.52% each had tubercles on ovary, tubes and peritoneum, and grade I endometriosis, hydatid cyst of morgagni was present in 4.76% (Table. 3).

The commonest hysteroscopic uterine cavity abnormality in primary and secondary infertility was endometrial polyp seen in 10.13% and 19.05% of the women respectively. The other hysteroscopic uterine cavity abnormalities are as shown in graph 3. Ostial abnormalities of corneal adhesions were present in women with secondary infertility (9.52%) while none of the women with primary infertility had ostial abnormalities. Table 4 shows the final diagnosis of the women evaluated

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on hysterolaparoscopy. In women primary infertility PCOS was the commonest finding noted in 18.99% while in those with secondary infertility pelvic inflammatory disease was the commonest diagnosis noted in 19.05% women. Majority of the women with primary and secondary infertility did not have any complications (96.20% and 90.48% respectively) (Table 5).

DISCUSSION: Laparoscopy is considered the gold standard for diagnosing tubal and peritoneal disease. It is transperitoneal endoscopic technique that provides direct visualization of pelvis and complete view of cul-de-sac, pelvic side walls and all pelvic viscera. Hysteroscopy is a procedure that involves insertion of an endoscope through the cervical canal into the uterine cavity and instillation of distention media to allow for visualization.¹¹

In the present study the commonest age groups was 26 to 30 years (57%). The mean age of the study population was 27.27 ± 3.59 years. Kore S et al,¹² in their study reported similar observation where most of the women studied were between 25-30 years of age. In the present study, the history of consanguineous marriage was noted in 20%. The menarcheal age in 52% of the women was 13 years. Majority (74%) of the women reported regular cycles while 26% of the women reported irregular menstrual history.

Almost half of the study population (50%) had duration of infertility between 4 to 6 years followed by 45% women with 3 years or less. The mean duration of infertility was 4.62 ± 1.58 years. Majority (79%) of the women presented with primary infertility while secondary infertility was noted in 21% of the women. Kore S et al,¹² in their study reported 34 patients had primary infertility and 6 had secondary infertility. Similarly Nayak PK et al¹³ from Odisha conducted a retrospective study to determine the role of diagnostic hysterolaparoscopy in the evaluation of infertility in tertiary care centres. Out of 300 cases, 206 (69%) patients had primary infertility.

Laparoscopic examination findings for size and shape of uterus included bulky, congested, hypoplastic (1.27% each) and irregular uterus (10.13%) in women who had primary infertility while in those with secondary infertility 4.76% of the women bulky uterus. Findings for size and shape of ovary included cystic (6.63%), endometrial implants (2.53%), enlarged (43.04%) and adhesions (1.27%) in women with primary infertility and in those with secondary infertility, cystic (9.52%), enlarged (4.76%), atrophic (4.76%) and adhesions (4.76%) were observed. Among the women with primary infertility, ovary color was shiny in 37.97% and pale in 2.53% of the women and in those with secondary infertility, shiny color was seen in 4.76% of the women.

The appearance of inflamed tubes was noted in 2.53% of women with primary infertility compared to 19.05% women with secondary infertility. Left adhesion was noted in one case of secondary infertility (4.76%) while in another case the fimbria was not seen (1.27%). Chromopertubation was positive in 72.15% of women with primary infertility compared to 42.86% of the women with secondary infertility. 10.13% of the women with primary infertility had subserous anterior wall as the fibroid location and subserous fundal location was seen in 1.27% but, in women with secondary infertility, the previous location was observed in 4.76% and none of the women had latter location. Endometrial implant adhesions were positive in 10.13% of the women with primary infertility compared to 9.52% women who had secondary infertility.

The peritoneal findings on laparoscopy included tubercles on ovary, tubes and peritoneum, omental adhesions and grade I endometriosis in 2.53% cases each and hydatid cyst of morgagni was present in 1.27% cases with primary infertility. In women with secondary infertility, 9.52% each had

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tubercles on ovary, tubes and peritoneum, and grade I endometriosis, hydatid cyst of morgagni was present in 4.76%. In the present study the commonest hysteroscopic uterine cavity abnormality in primary and secondary infertility was endometrial polyp seen in 10.13% and 19.05% of the women respectively. The ostial abnormalities of corneal adhesions were present in women with secondary infertility (9.52%) while none of the women with primary infertility had ostial abnormalities.

In the present study women primary infertility PCOS was the commonest finding noted in 18.99% while in those with secondary infertility pelvic inflammatory disease was the commonest diagnosis noted in 19.05% women. The other diagnosis in women with primary infertility included Uterine fibroid (10.13%), Endometriosis (6.33%), PID, Ovarian cyst (3.80% each), Endometrial polyp, PCOS with PID, Pelvic TB, Tubal block with PCOS (2.53% each), Unicornuate uterus, Fibroid with tubal block, Fimbrial cyst with hypoplastic uterus, Hydatid cyst of morgagni, Arcuate uterus, (1.27% each) while 40.51% of the women had normal findings. The other diagnosis in women with secondary infertility included Endometrial polyp (14.29%), Uterine fibroid, Ovarian cyst (9.52% each), Arcuate uterus (4.76% each) and 42.86% of the women had normal findings.

In a study by Sing R. et al¹¹ laparoscopy abnormalities were found in 68% patients. Peritoneal adhesions (29%) and polycystic/multicystic ovaries (26%) were the most common findings. Other findings were phimosis/hydrosalpinx (19%), tubo-ovarian masses (16%), endometriosis (4%), functional ovarian cyst (8%), myomas (3%) and congenital abnormalities (10%). Sajida Parveen et al¹⁴ who reported adhesions (11.2%), endometriosis (8%), phimosis/hydrosalpinx (6%), polycystic ovaries (19.35%), functional ovarian cyst (4.8%), myoma (4.83%), congenital abnormalities (12.9%), tuboovarian masses (8%) and normal findings in 16.2%, patients. Sing R. et al¹¹ in their study reported abnormal hysteroscopy finding in 50% patients.

The most common finding was thick/irregular endometrium in 15% patients followed by intra-uterine adhesions in 11% patients. Other findings were endometrial polyps (7%), myomas (2%), congenital abnormalities (7%), atrophic endometrium/ sclerotic ostia (6%), and fetal bones embedded in endometrium (2%). Boudhraa et al⁴ also reported intra-uterine adhesion (23%), atrophic endometrium/ sclerotic ostia (7.5%), endometrial polyp (10%), congenital abnormalities (3.5%), Irregular/ thick endometrium (19%) and normal findings (25%). Malhotra N et al.⁵ reported intra-uterine adhesions (25%), atrophic endometrium (9.4%) and congenital abnormalities (6.1%). Shokeir TA, et al¹²² in 2006 conducted a prospective study on 612 consecutive infertile women to clarify the role of a combined diagnostic approach using laparoscopy and hysteroscopy in the evaluation of female infertility in developing countries. Laparoscopy was successful in 608 and hysteroscopy in 597 patients.

The most frequent pathologies detected hysteroscopically in the infertile group were adhesive in nature and believed to be post-traumatic and/or post-phlogistic. A significant number of women with secondary infertility had abnormal hysteroscopic findings when compared to either women with primary infertility. Boudhraa K et al¹⁵ in 2004 conducted a retrospective study of about 200 cases of hysterolaparoscopy performed for female infertility in women admitted at the department of Gynecology and Obstetrics in Mongi Slim's Hospital La Marsa Tunis. They concluded that hysteroscopy was abnormal in 75% of cases: the uterine synechias (23%), endometria hypertrophy (19%), endometrial polyps (10%), uterine fibroids (9%), atrophy (7.5%) and malformations (3.5%). Sortey KD et al¹⁶ conducted a study of 100 cases of infertility in K.E.M. Hospital, Bombay. Laparoscopic evaluation of 100 cases of infertility showed normal pelvic organs in

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28%, tubal pathology in 52% i.e. tubal block, peritubal adhesions, tubo-ovarian mass and tuberculous salpingitis. Ovarian factors in 10% i.e., smooth ovaries, polycystic ovaries, streak ovaries and ovarian masses. In 25% cases extensive pelvic adhesions were encountered of which 21 had previous explorations and 7 cases had TB. Other findings were fibroids, endometriosis, congenital genital abnormalities & extensive abdominal TB.

Recently Singh R, et al¹¹ in 2012 evaluated the role of diagnostic laparohysteroscopy in the management of infertile females. Total 100 infertile couples attending the outpatient department of obstetrics and Gynecology were selected. 60 couples belonged to primary infertility group while 40 couples belonged to secondary infertility group. All patients underwent transvaginal sonography with sonosalpingography. Then all patients were subjected to combined laparohysteroscopy including chromopertubation and the results were recorded.

The laparoscopy was abnormal in 68% cases: Peritoneal and peri-tubal adhesions (29%), phimosis/hydrosalpinx (19%), polycystic ovaries (26%), tubo-ovarian masses (16%), endometriosis (4%), congenital abnormalities (10%), myomas (3%), bilateral tubal blockage (49%) and unilateral tubal blockage (17%). The hysteroscopy was abnormal in 50% cases: uterine synechias (11%), thick endometrium (15%), endometrial polyps (7%), myomas (2%), atrophy (6%), congenital abnormalities (7%) and fetal bones (2%). Godinjak Z, et al¹²⁸ conducted a retrospective study in 2008 to clarify the role of simultaneous combined diagnostic approach using laparoscopy and hysteroscopy in the evaluation of 360 infertile women.

Laparoscopy and hysteroscopy were successful in 360 patients. Bilateral tubes were blocked in 18 (5%) and unilateral tubal occlusion were in 30 (8, 33%) of patients. Pelvic adhesions were revealed in 40 (11, 11%), and myomas in 42 (11, 65%) out of that 31 (8, 6%) were revealed by laparoscopy and 11 (3, 05%) by hysteroscopy. Endometrial polyps were revealed in 26 (7, 22%) and Syndrome Asherman in 3(0, 83%) of patients. Uterine anomaly was found in 19 (5, 27%) of cases and out of that septate uterus in 7(37, 15%), bicornuate uterus in 5(26, 31%), arcuate uterus in 4 (21, 26%) and uterus unicornu cum cornu rudimentario in 3(15, 27%) of uterine anomalies. Endometriosis was found in 51(14, 16%), dermoid cysts in 8(2, 22%) and in 16(4, 44%) functional cysts of patients. Also, Fitz-Hugh-Curtis syndrome was revealed in 23 (6, 11%) patients.

More recently a retrospective study by Jayakrishnan K et al¹⁷ in Kerala evaluated the role of diagnostic laparoscopy in women who fail to conceive after empirical treatment with ovulation induction and intrauterine insemination. Of the 127 women who underwent diagnostic laparoscopy and hysteroscopy, 87.4% (n=111) of patients had positive findings. Significant pelvic pathology (moderate endometriosis, pelvic inflammatory disease, and tubal pathology) was seen in 26.8% of cases. Similarly Nayak PK et al¹³ from Odisha conducted a retrospective study to determine the role of diagnostic hysterolaparoscopy in the evaluation of infertility.

Laparoscopy detected abnormalities in 34% of the cases, significant hysteroscopy findings were noted in 18% of cases. Together, diagnostic hysterolaparoscopy detected abnormalities in 26% of the infertile patients in both groups. While the most common laparoscopic abnormality was endometriosis (14%) and adnexal adhesion (12%) in primary and secondary infertile patients, respectively, hysteroscopy found intrauterine septum as the most common abnormality in both groups.

In this study majority of the women with primary and secondary infertility did not had any complications (96.20% and 90.48% respectively). Complication of hemorrhage (2.53%) and infection

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(1.27%) were noted in those with primary infertility while in women with secondary infertility hemorrhage was present in 4.76%. Serious complications of diagnostic and operative laparoscopy are rare. The major risk is damage to the bowel, bladder, ureters, uterus, major blood vessels or other organs, which may require additional surgery.

Injuries can occur during the insertion of various instruments through the abdominal wall or during operative treatment. Certain conditions may increase the risk of serious complications. These include previous abdominal surgery, especially bowel surgery, and a history or presence of bowel/pelvic adhesions, severe endometriosis, pelvic infections, obesity, or excessive thinness. Allergic reactions, nerve damage and anesthesia complications rarely occur. Postoperative urinary retention is uncommon and venous thrombosis (blood clot) is rare.⁷

Overall the present study showed the usefulness of hysterolaparoscopy in the diagnosis of primary and infertility. The limitation of the study was that, we encountered various diagnosis with small proportion of patients which limited this study from establishing the association between type of infertility and commonest etiology. Further studies with large sample and with diagnosis specific evaluation would further focus the role of hysterolaparoscopy in the diagnosis and management of primary and secondary infertility.

CONCLUSION: Many diagnostic tests for female infertility have screening value but hysterolaparoscopy remains the gold standards. Based on the results of this study it be concluded that, while investigating the causes of female infertility, combined simultaneous diagnostic laparoscopy and hysteroscopy should be performed in all infertile patients before treatment.

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Findings	Primary (n=79)		Secondary (n=21)	
	Number	Percentage	Number	Percentage
Shiny	30	37.97	1	4.76
Pale	2	2.53	0	0.00
Normal	47	59.49	20	95.24
Total	79	100.00	21	100.00

Table 1: Laparoscopic examination findings - Ovary color

Findings	Primary (n=79)		Secondary (n=21)	
	No.	%	No.	%
Left blind end	1	1.27	0	0.00
Left blocked	1	1.27	0	0.00
Left fimbrial cyst	1	1.27	0	0.00
Left adhesions	0	0.00	1	4.76
Left fallopian tube adherent to uterus	0	0.00	1	4.76
Right fallopian tube adherent to uterus	1	1.27	0	0.00
Inflamed	2	2.53	4	19.05
Normal	73	92.41	15	71.43
Total	79	100.00	21	100.00

Table 2: Laparoscopic examination findings - Tubes color and appearance

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Findings	Primary (n=79)		Secondary (n=21)	
	No.	%	No,	%
Tubercles on ovary, tubes and peritoneum	2	2.53	2	9.52
Hydatid cyst of morgagni	1	1.27	1	4.76
Grade I endometriosis	2	2.53	2	9.52
Omental adhesions	2	2.53	0	0.00

Table 3: Laparoscopic findings - Peritoneal findings

Diagnosis	Primary (n=79)		Secondary (n=21)	
	No	%	No	%
PCOS	15	18.99	0	0.00
Uterine fibroid	8	10.13	2	9.52
Endometriosis	5	6.33	0	0.00
PID	3	3.80	4	19.05
Ovarian cyst	3	3.80	2	9.52
Endometrial polyp	2	2.53	3	14.29
PCOS with PID	2	2.53	0	0.00
Pelvic TB	2	2.53	0	0.00
Tubal block with PCOS	2	2.53	0	0.00
Para ovarian cyst	1	1.27	0	0.00
Unicornuate uterus	1	1.27	0	0.00
Fibroid with tubal block	1	1.27	0	0.00
Fimbrial cyst with hypoplastic uterus	1	1.27	0	0.00
Hydatid cyst of morgagni	1	1.27	0	0.00
Arcuate uterus	0	0.00	1	4.76
Normal	32	40.51	9	42.86
Total	79	100.00	21	100.00

Table 4: Final diagnosis

Findings	Primary (n=79)		Secondary (n=21)	
	No.	%	No.	%
Hemorrhage	2	2.53	1	4.76
Infection	1	1.27	0	0.00
Urinary tract infection	0	0.00	1	4.76
Absent	76	96.20	19	90.48
Total	79	100.00	21	100.00

Table 5: Complications

ORIGINAL ARTICLE

ORIGINAL ARTICLE

Photograph 1: Instruments

Photograph 2: Trocar insertion

Photograph 3: Laparoscopic surgery

Photograph 4: Adhesions

Photograph 5: Caseous nodules

Photograph 6: Chromopertubation

ORIGINAL ARTICLE

Photograph 7: Closed tubal ostium

Photograph 8 and 9: Endometrial polyp

Photograph 10: Endometriosis

Photograph 11: Hyatid of morgagni

Photograph 12: Inflammed tubes

Photograph 13: Multiple fibroids

ORIGINAL ARTICLE

Photograph 14: Polycystic ovary syndrome

Photograph 15: Hydrosalpinx

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